

REMARKS

Claims 1-4, 6 and 8-20 are pending in this application, of which claims 1, 6, 8 and 9-10 have been amended. Claims 5 and 7 are canceled and new claim 20 has been added.

The Examiner has objected to the drawings for including reference numeral "32" not mentioned in the description. Applicants presume the Examiner is erroneously referring to numeral "32c", which is shown in FIG. 2 as an identifier for the heat resistant coating layer disclosed on page 4, line 30 of the specification. Accordingly, the specification has been amended to properly refer to item 32c.

The Examiner has asserted that the ablative material has not been explicitly identified in the specification.

Applicants respectfully disagree. Page 6, lines 20-23 disclose that "the ablation cooling method" uses a "composite heat resistant material structure with metal core." At least the hub members and blade rib members have this composite structure, as shown in FIGS. 2, 4, 7 and 8.

Claims 1, 2, 11 and 15-19 stand rejected under 35 U.S.C. § 102(b) as anticipated by U.S. Patent 3,242,670 to Buswell (hereafter "Buswell"); and claims 1, 2, 11-13 and 15 stand rejected under 35 U.S.C. § 102(b) as anticipated by U.S. Patent 3,479,819 to Bogue (hereafter "Bogue");

Applicants respectfully traverse these rejections.

Buswell discloses a segmented baffle injector for a rocket engine combustion chamber. A segmented injector head supports and provides propellant to porous baffles which extend therefrom into and segment the combustion chamber.

Bogue discloses an injector for injecting two fluids having a multiplicity of radially arranged spray bars which project inwardly from a manifold with the bars having a cooperating member with arms which completes the face of the injector. One fluid is fed to the spray bars and enters the combustion chamber from small openings or nozzles therein while the other fluid is injected from between spray bars and member in a radial line. The center of the member and arms having areas covered with porous metal so that a coolant can be fed therethrough to protect the face of the injector during operation. The portion of the spray bars facing the combustion chamber are provided with inserts of a high conductivity material to aid in keeping the face of the injector at a safe temperature.

Neither Buswell nor Bogue discloses the ablative composite structure formed of a heat resistant material and a metal core for a hub member and a plurality of blade rib members. (The blade-connecting member uses a heat resistant material consisting of zirconia).

Accordingly, claim 1 has been amended to recite such an ablative composite structure for the hub member and the plurality of blade rib members, and claims 5 and 7 have been canceled.

Thus, the 35 U.S.C. § 102(b) rejections should be withdrawn.

Claims 5-8, 10, 14 and 17-19 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Bogue in view of U.S. Patent 3,742,701 to Feemster et al. (hereafter “Feemster et al.”) or U.S. Patent 3,790,088 to Wilson (hereafter “Wilson”) and optionally in view of Buswell.

Applicants respectfully traverse this rejection.

The Examiner has urged that Bogue teaches an insulating layer 29 for blade rib member 22 which may be ablative, and he has cited both Feemster et al. and Wilson for teaching ablative layers for cooling/thermal protection.

Applicants respectfully disagree. As noted above, Bogue uses porous metal to conduct coolant therethrough to provide cooling, and uses protective layer 29 as insulation to prevent boiling of a fluid being passed therethrough, as disclosed in column 2, lines 54-57.

Feemster et al. discloses an ablative coating 55 for covering the exterior surface of valve 45 in a propellant injector assembly and Wilson discloses an ablative face 8 for a core 6 in a cylindrical housing 2 of a propellant splash plate for use with a splash plate injector. Thus, both of these references are irrelevant to the present invention and it would not be obvious to combine either of their teachings of ablative coatings with Bogue because Bogue teaches away from the use of an ablation cooling method because of the use of porous metal for passing cooling liquid.

Thus, the 35 U.S.C. § 103(a) rejection should be withdrawn.

Claims 1, 2 and 11-14 stand rejected under 35 U.S.C. § 103(a) as unpatentable over U.S. Patent 6,352,030 to Doll et al. (hereafter “Doll et al.”) in view of Bogue;

Applicants respectfully traverse this rejection.

Doll et al. discloses a gas generating eject motor including a case containing an ignitable low temperature gas generant material that does not produce toxic gases upon the combustion thereof. The gas generant material is generally contained with a screen enclosure housed within the case. An igniter is disposed within the gas generant material for selectively igniting the gas

generant to thereby generate combustion gases. A nozzle is disposed within an open aft end of the case for focusing and directing the combustion gases generated by the ignited gas generant material. The case is constructed and arranged to be separably attached to the aft end of a rocket to be launched from a launch platform, so that, upon ignition of the gas generant, the combustion gases focused by the nozzle will apply a thrust to the rocket and thereby propel, or eject, the rocket from the launch platform, at which time the combustive propellant of the rocket motor will ignite and the eject motor will be separated from the rocket.

The Examiner has urged that Doll et al. discloses a baffle structure, presumably shown as 32 in FIG. 2.

Applicants respectfully disagree. Numeral 32 represents a retainer wheel which supports a screen mesh 34. FIG. 2 shows that the aft screen assembly 30 comprises a screen mesh 34 (see FIG. 3) which contacts the gas generant material 24 and a retainer wheel 32 which supports the screen mesh 34. As shown in FIG. 2, the retainer wheel 32 generally comprises an outer ring 60, an inner hub 62 having a central opening 64 formed therein, and a plurality of radially extending spokes 66 extending between the outer ring 60 and the inner hub 62. In the illustrated embodiment, eight spokes spaced by 45° are provided. The screen pack 26 and the aft screen assembly 30 both filter and condense solid combustion products created during combustion of the gas generant material and thereby cool the combustion gases.

In contrast, the ablative baffle in the present invention performs the function of reducing combustion instability by damping resonances, as shown in FIG. 10.

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Thus, the 35 U.S.C. § 103(a) rejection should be withdrawn.

Claims 5-8 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Doll et al. in view of Feeemster et al. or Wilson;

Applicants respectfully traverse this rejection.

Claims 5 and 7 have been canceled, and claims 6 and 8 have been amended to depend from claim 1. As noted above, none of these references teaches, mentions or suggest the features recited in claim 1, as amended.

Thus, the 35 U.S.C. § 103(a) rejection should be withdrawn.

Claims 3-4 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Doll et al. in view of Bogue and further in view of U.S. Patent 2,884,859 to Alexander et al. (hereafter "Alexander et al.")'

Applicants respectfully traverse this rejection.

Alexander et al. discloses a rocket projectile with blade rib ignition holes 28 but fails to disclose the composite structure for an ablative baffle of the present invention.

Alexander et al., like the other cited references, fails to teach, mention or suggest the features recited in claim 1, as amended, from which these claims depend.

Thus, the 35 U.S.C. § 103(a) rejection should be withdrawn.

Claims 16-19 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Doll et al. in view of Buswell.

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Applicants respectfully traverse this rejection.

As noted above, none of these references teaches, mentions or suggests the features recited in claim 1, as amended, from which these claims depend.

Thus, the 35 U.S.C. § 103(a) rejection should be withdrawn.

Claim 9 stands rejected under 35 U.S.C. § 103(a) as unpatentable over “any of the art as applied to claim 7 above, and further in view of U.S. Patent 3,545,203 to Rumbold (hereafter “Rumbold”).

Applicants respectfully traverse this rejection.

Rumbold discloses an injector face formed of an ablative body in a combustion chamber of a rocket engine, and has been cited for teaching a plurality of wedges in order to facilitate a secure connection.

Rumbold, like the other cited references fails to teach, mention or suggest the composite structure for an ablative baffle, as recited in claim 1, as amended, from which claim 9 has been amended to depend.

Thus, the 35 U.S.C. § 103(a) rejection should be withdrawn.

In newly-added claim 20, each blade rib member has a protrusion part at its one end. The protrusion part can be inserted into the connecting hole formed on the outer surface of the hub member. Also, each blade rib is connected directly with the divided part of each blade-connecting member at the other end of the blade rib. When one of the blade ribs is damaged, it is necessary to change only the damaged blade rib with a new one.

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Buswell does not show such a structure. In Buswell, spaced walls 110, 112 of baffle 42 are connected to either vane 40 or central member 70 at their forward ends 116 by welding of the like (see column 3, lines 69-73), and cylinder baffle member 43 is attached to the inner ends of the baffle members 42 (see column 4, lines 41-43). If one of the baffle members 32 is fractured, all parts of the baffle must be changed, in contrast to the present invention, as recited in newly-added claim 20.

In view of the aforementioned amendments and accompanying remarks, claims 1-4, 6 and 8-20, as amended, are in condition for allowance, which action, at an early date, is requested.

If, for any reason, it is felt that this application is not now in condition for allowance, the Examiner is requested to contact Applicants' undersigned attorney at the telephone number indicated below to arrange for an interview to expedite the disposition of this case.

In the event that this paper is not timely filed, Applicants respectfully petition for an appropriate extension of time. Please charge any fees for such an extension of time and any other fees which may be due with respect to this paper, to Deposit Account No. 01-2340.

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Respectfully submitted,

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PATENT TRADEMARK OFFICE

Enclosure: Substitute Abstract of the Disclosure

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